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(54) Anti-slip layer for a package or for an anti-slip sheet

(57) The present invention provides a package. The outermost surface of a wall of the package comprises at least partially an anti-slip layer so that the anti-slip layer is in contact to an adjacent package when the package is stacked with other packages in an assembly. The present invention further provides an anti-slip sheet for interposing in an assembly of stacked packages, whereby the anti-slip sheet comprises on at least one side of the anti-slip sheet an anti-slip layer and the anti-slip layer covers at least partially the side of the anti-slip sheet. The anti-slip layer is made of a silicone based material. The present invention further provides an assembly of stacked packages and a method for applying an anti-slip layer on the package or on the anti-slip sheet.

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Description

Field of the invention

The present invention relates to packages for containing detergent compositions or to anti-slip sheets, which are interposed within an assembly of stacked items, comprising an anti-slip layer.

Background of the invention

Several packages are suitable for containing granular detergent, like cartons made of cardboard or pouches made of flexible multi-layer materials. Sift proof containment and appropriate protection of the granular detergent from the outside can be achieved with such packages known in the art. The filled or unfilled packages can be stacked in rigid cardboard outer packaging. Usually, to reduce the packaging costs, the rigid cardboard outer packaging are replaced by wrappings with paper or plastic films. However, this wrapped assembly has to be fastened together to keep this assembly together especially during storage, shipment or transportation. A fastening means which keep this assembly together is usually a further outer packing of the assembly, like wrapping the assembly with a plastic film.

However, it has been found that these fastening means are not always sufficient to stabilise the assembly throughout the whole storage, shipment and transport. This is mainly due to fact that most of the packages have outermost surfaces which do not provide a sufficient friction force when the outermost surfaces of these packages interact with each other. In practice, the outermost surfaces of the stacked packages may allow slipping of the packages in the stacked assembly. Consequently, the packages may displace from their original place within the assembly. The displacement in the assembly of a package may eventually damage the package, since the displaced package may carry a load of the assembly on a part of the package which is not suitable to carry a load.

Instead of or in addition to the external fastening means, it is known to provide assemblies with anti-slip sheets. An anti-slip sheet comprises at least one outermost surface which is treated in such a manner to have a surface with anti-slipping properties. These anti-slip sheets are interposed between the stacked packages. The anti-slip sheet provides an increased friction force between the stacked packages. Consequently, undesirable movements of the packages in the assembly are reduced. These anti-slip sheets exert their anti-slip effect even when the external fastening means holding the assembly of stacked packages together have been removed.

However, the anti-slip layers for the anti-slip sheets known in the art have some drawbacks. There are anti-slip layers obtained by a glue or by an acrylic resin or by an elastomer. This glue once hardened on the surface leaves some visible droplets on the surface. It has been found that a surface treated in this way achieves a very high friction. However, the high friction exerted by the hardened glue may result in a surface damage of the stacked package. Indeed, the outermost surface of a package may remain stuck onto the anti-slip sheet. When trying to detach the package from the anti-slip sheet, part of the outermost surface of the package may be ripped away sticking on the anti-slip sheet. Furthermore, such anti-slip sheets are difficult to use in an automatic assembly former, since the anti-slip sheets tend to tightly stick to each other impeding a rapid separation of the anti-slip sheets from one another.

Another anti-slipping layer for an anti-slip sheet is a layer with embossed areas applied onto a base surface. The layer with the embossed areas forms the anti-slip surface of the sheet. However, the method for making such embossed areas is quite complicated and expensive. It has been further found that the anti-slipping effect of such an embossed layer is quite low and not sufficiently effective for stabilising assemblies of stacked packages.

Furthermore, the anti-slip layers of the prior art are not directly applied on an outermost surface of a wall of a package. Indeed, the high stickiness of the glue as described before is a hindrance to a comfortable handling of the package by a user. For example, it has been found that the hands of the user may strongly stick on such an anti-slip layer which is considered as a nuisance by the user. The embossed areas cannot be applied directly on an outermost surface of package without substantially increasing the manufacturing costs of such a package and achieving only a poor anti-slipping effect.

It is therefore an object of the present invention to provide an anti-slip layer which can be applied on an anti-slip sheet or on a package and which is cost efficient and has sufficient anti-slip properties, so to avoid slipping of stacked packages in an assembly, without damaging the packages coming in contact with the anti-slip layer.

Summary of the invention

The present invention is a package. The outermost surface of a wall of the package comprises at least partially an anti-slip layer so that the anti-slip layer is in contact to an adjacent package when the package is stacked with other packages in an assembly. The anti-slip layer is made of a silicone based material.

The present invention is further an anti-slip sheet for interposing in an assembly of stacked packages, whereby the anti-slip sheet comprises on at least one side of the anti-slip sheet an anti-slip layer and the anti-slip layer covers at least

partially the side of the anti-slip sheet. The anti-slip layer is made of a silicone based material.

The present invention is further a method for applying an anti-slip layer on the package or on the anti-slip sheet, whereby the anti-slip layer is printed and/or sprayed onto the package or onto the anti-slip sheet.

Detailed description of the invention

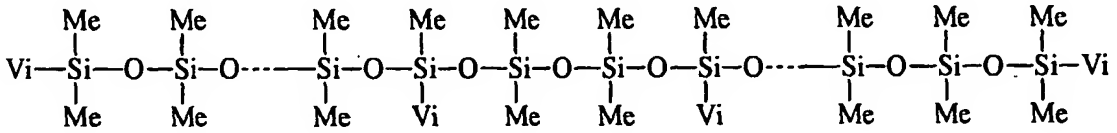
The package according to the present invention comprises an anti-slip layer. The package may be any package suitable for containing any kinds of goods. Preferably, the package is suitable to contain detergent compositions. Preferred packages are cartons made of cardboard or corrugated board for containing granular detergent compositions. Also flexible pouches made of a flexible multi-layer plastic film can be used for containing granular or liquid detergent compositions. The package according to the present invention may further encompass canisters or bottles. The package usually comprises a bottom wall, a top wall and lateral walls completely enclosing the content of the package when the package is formed, filled and closed.

The package may be made of a material selected from the group consisting of: tissue, metal, paper, cardboard, plastic materials, multi-layered materials and a combination thereof. As plastic materials polyolefines, like polyethylene (=PE), or (oriented) polyethylene terephthalate, or (oriented) polypropylene or a combination thereof, may be used. For multi-layer materials, the intermediate layers may comprise a perfume barrier layer, a gas barrier layer, an oxygen barrier layer, a moisture barrier layer, or a combination thereof. Preferably, the intermediate layer is made of a material selected from the following group consisting of: aluminium foil, ethyl vinyl alcohol co-polymer (=EVOH), lacquer coating and a combination thereof.

The anti-slip layer is located on at least one wall of the outermost surface of the package. The anti-slip layer covers at least partially the wall of the package. Preferably, the anti-slip layer covers at least 25% of the outermost surface of the wall, more preferably at least 50% of the outermost surface of the wall, most preferably at least 75% of the outermost surface of the wall. The anti-slip layer is preferably a continuous layer on the outermost surface of the wall. Alternatively, the anti-slip layer is a series of discontinuous islands on the outermost surface of the wall.

Preferably, the package comprises the anti-slip layer at least on the outermost top wall or bottom wall of the package when the package is formed, filled and closed/sealed and stacked in an assembly. In this manner, the anti-slip material interacts with the bottom wall or top wall of another stacked package. In another preferred execution, the package comprises the anti-slip layer at least on both the outermost top and bottom walls of the package when the package is formed, filled and closed/sealed and stacked in an assembly. This further ensures that the package does not slip even when the package is stacked in an assembly with other packages not having any anti-slip layer. Optionally, the anti-slip layer may also be on the outermost lateral walls with respect to the top and bottom walls of the package. The anti-slip layer located on the lateral walls of the package prevent lateral slipping of the package in an assembly. Furthermore, the anti-slip layer on the lateral walls of the package improves the gripping and handling of the package.

Furthermore, the anti-slip layer according to the present invention is such to avoid any surface damage between stacked packages. The anti-slip layer for a package according to the present invention is made of a silicon based material. The silicon based material comprises a silicone oxide polymer with one or more active vinyl groups. Preferably, the chemical formula of the silicone based material is the following:



The length of the silicone based material determines the level of stickiness of the anti-slip layer. Indeed, the greater the length of the silicone polymer the greater the stickiness of the anti-slip layer. Preferably, the silicone polymer is has between 80 and 500 groups of methyl silicone oxides, more preferably, between 100 and 200 groups of methyl silicone oxides. Preferably, this silicone based material is applied on the surface in an amount of between 0.1 g/m^2 to 100 g/m^2, more preferably in an amount of between 1 g/m^2 to 10 g/m^2. Such a silicone based material is available from Dow Corning Europe under the trade name SYL-off(r) 7635 Release Modifier.

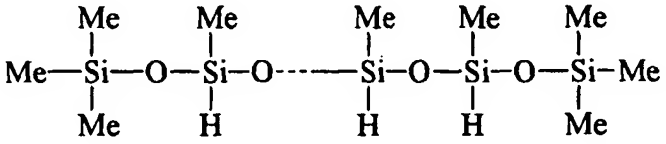
It has been found that this material can be applied on various packages of different material with a printing and/or spraying process. In particular, the silicon based material can be applied with conventional printing techniques on printable surfaces of the packages. The silicon based material is preferably applied as an anti-slip layer on the printing press before, during or after the printing process of the package itself. The following printing techniques can be used to apply

the anti-slip layer according to the present invention: flexographic, gravure, frontal, offset, silk screen. Afterwards, the printed silicon based material is cured to ensure complete crosslinking of the silicon based material onto the outermost surfaces of the packages. The curing can be obtained by exposing the silicon based material to heat or to ultraviolet light. In this manner the silicon based material becomes a hard, transparent surface layer on the packaging.

The anti-slip layer according to the present invention can also be sprayed onto a wall of the package. In particular, the anti-slip layer can be applied with a conventional spray gun. Afterwards, the sprayed anti-slip layer is cured to ensure complete bonding of the anti-slip layer onto the outermost surface of the sheet. It has been found that the printing or the spraying of the anti-slip layer onto a wall of the package is cost efficient and easy. Indeed, no hot melting, for example, of the anti-slip layer onto the package is needed. This means that no specific machines are needed apart a printing machine, which is already available on packing machines, or spray guns, which are less expensive than hot melting machines.

The silicone based material can be printed and/or sprayed onto the package in different patterns. Different patterns may allow to improve the anti-slipping effect of the package. For example, a first anti-slip layer is applied on a first wall of a first package along linear stripes, whereas a second anti-slip layer is applied on a wall of a second package with a different pattern. The pattern of the second anti-slip may be such that it is perpendicular to the first pattern when the first package is stacked on the second package. In this manner any slipping in the horizontal plane is prevented. It has been further found that the silicone based material according to the present invention is also water repellent. Consequently, a package treated with the silicon based material is more resistant to outside influences, like water and moisture.

The silicon based material is applied onto a wall of the package in the following manner. Firstly, the silicone based material is mixed with a crosslinker. The crosslinker is such to improve the bonding of the silicone based material onto the outermost surface of a wall of a package. The preferred crosslinker is another silicone based material comprising preferably up 100 groups of methyl silicone oxides, more preferably between 20 and 80 groups of methyl silicone oxides. Preferably, the chemical formula of the crosslinker is the following:



Such a crosslinker is available also from Dow Corning Europe under the trade name Dow Corning (r) 7603 Crosslinker The crosslinking reaction is initiated by a Group VIII metal catalyst, e.g. platinum. Preferably, the ratio between the amount of silicone based material and the crosslinker is between 9:1 to 5:5, more preferably between 9:1, most preferably 4:1. The mixture is then printed and/or sprayed on the outermost surface of a package with the before mentioned printing and/or spraying techniques. Finally, the printed and/or sprayed mixture is cured with infrared or ultraviolet light. The external appearance of the anti-slip layer applied on a surface is transparent. Furthermore, the anti-slip layer feels smooth and non-sticking to the touch. The smoothness is not only more comfortable for the user to handle the package or the anti-slip sheet, but also facilitates the automatic feeding of packages comprising the anti-slip layer according to the present invention in a packing line.

The anti-slip layer according to the present invention made of a silicone based material as described above can be applied also on an anti-slip sheet. The anti-slip sheet is a sheet of appropriate size interposed between stacked items of an assembly, like an assembly of stacked packages, to stabilise the assembly. The anti-slip layer covers at least partially one side of the anti-slip sheet, so that the anti-slip sheet stabilises an assembly when the sheet is interposed in an assembly of stacked items. Preferably, the anti-slip layer is on opposite sides of the anti-slip sheet. In this manner, the surface exercises its anti-slipping effect on both sides of the anti-slip sheet. Consequently, when such an anti-slip sheet is interposed in an assembly of stacked packages the anti-slipping sheet acts on the packages located below and above the anti-slip sheet. This further improves the anti-slipping effect exerted by the anti-slip sheet in the stacked assembly.

The method to apply the anti-slip layer on the anti-slip sheet is the same as described before for the package. Although the package comprising the anti-slip layer according to the present invention is found to be sufficient to stabilise an assembly of stacked packages, an anti-sheet can be further added in the assembly of stacked packages.

Preferably, the static coefficient of friction measured according to DIN 53375 between two anti-slip layers according to the present invention in contact with each other is at least 0.5, more preferably at least 1.0. Preferably, the kinetic coefficient of friction measured also according to DIN 53375 between two anti-slip layers according to the present

invention in contact with each other is at least 0.5, more preferably at least 1.0. According to DIN 53375 the coefficient of friction is a measurement value of the friction and is measured in the following manner. A sled of 200 g and having a surface of dimension 65 cm x 65 cm is covered with a surface made of a particular material, e.g. a cardboard surface comprising the anti-slip layer according to the present invention. This sled is placed on another horizontal surface whereby the 65 cm x 65 cm surface of the sled is adjacent the horizontal surface. The sled is forced to slide on the other horizontal surface at a specific speed of 10 cm/min for fixed period of time of 10 s.

In the following table, the static and kinetic coefficients of friction measured according to DIN 53375 are reported for different surfaces. Surface A is a surface comprising the anti-slip layer according to the present invention. Specifically, A comprises an amount of 1 g/m^2 of anti-slip layer obtained from the silicon based material SYL-off (r) 7635 Release Modifier crosslinked with Dow Corning (r) 7603 Crosslinker both of Dow Corning Europe. Surface B is a varnished cardboard without any anti-slip layer as used for example for the carton containing the granular detergent composition ARIEL® of The Procter & Gamble Company. Surface C is made of polished stainless steel (INOX®).

TABLE

B on B	static	0.43
	kinetic	0.34
A on B	static	1.12
	kinetic	0.94
A on A	static	0.9
	kinetic	0.7
A on C	static	1.18
	kinetic	1.03

As can be seen from the Table, the coefficient of friction is almost tripled between a surface having the anti-slip layer according to the present invention and a surfaces without any anti-slip layer. Consequently, this improves the stability of an assembly of stacked packages comprising the anti-slip layer according to the present invention.

Claims

1. A package characterised in that at least partially the outermost surface of a wall of the package comprises an anti-slip layer so that the anti-slip layer is in contact to an adjacent package when the package is stacked with other packages in an assembly, and that the anti-slip layer is made of a silicone based material.

2. A package according to claim 1 characterised in that the silicone based material comprises a silicone polymer with at least one active vinyl group.

3. A package according to claim 2 characterised in that the silicone based material comprises between 100 and 500 groups of methyl silicone oxide with one or more active vinyl groups.

4. A package according to any of the preceding claims characterised in that the package is made of cardboard.

5. An anti-slip sheet for interposing in an assembly of stacked packages, the anti-slip sheet comprising on at least one side of the anti-slip sheet an anti-slip layer, the anti-slip layer covering at least partially the side of the anti-slip sheet, characterised in that the anti-slip layer is made of a silicone based material.

6. An anti-slip sheet according to claim 5 characterised in that the silicone based material comprises a silicone polymer with at least one active vinyl group.

7. An anti-slip sheet according to claim 6 characterised in that the silicone based material comprises between 100 and 500 groups of methyl silicone oxide.

8. An assembly of stacked packages characterised in that the packages of the assembly are according to any of claims 1 to 4.

9. An assembly of stacked packages characterised in that the assembly comprises an anti-slip sheet according to any of claims 5 to 7 interposed between the stacked packages.

10. An assembly of stacked packages characterised in that the assembly is according to claim 8 and claim 9.

11. A method for applying an anti-slip layer on a package according to any of claims 1 to 4 and onto an anti-slip sheet according to any of claims 5 to 7, the anti-slip layer being made of a silicone based material, characterised in that the anti-slip layer is printed and/or sprayed partially onto a wall of the package or onto a side of the anti-slip sheet.

12. A method according to claim 11 characterised in that the silicone based material is mixed with a crosslinker before printing and/or spraying the anti-slip layer.

13. A method according to claim 12 characterised in that the crosslinker is another silicone based material, preferably comprising up 100 groups of methyl silicone oxide.

14. A method according to any of the preceding claims 11 to 13 characterised in that the crosslinking between the silicone based material and the crosslinker is initiated by a Group VIII metal catalyst.

15. A method according to any of the preceding claims 11 to 14 characterised in that the anti-slip layer is printed through gravure printing or offset printing or flexo-printing.

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 97 20 0683

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X Y	DE 17 79 373 A (DUERBECK PAPIERSACKFAB) 7 October 1971 * the whole document *	1,8,11 5,9	B65D57/00 B65D5/42 B65D33/00
X	PATENT ABSTRACTS OF JAPAN vol. 018, no. 229 (M-1598), 26 April 1994 & JP 06 023917 A (HONSHU PAPER CO LTD), 1 February 1994, * abstract *	1,4,8,11	
A	PATENT ABSTRACTS OF JAPAN vol. 018, no. 058 (C-1159), 31 January 1994 & JP 05 272066 A (GOORUDEN TAITO SHOJI KK;OTHERS: 01), 19 October 1993, * abstract *	1,15	
Y A	EP 0 472 932 A (SENSORMATIC ELECTRONICS CORP) 4 March 1992 * the whole document *	5,9 11	
A	US 3 246 831 A (H.TEICHER)		TECHNICAL FIELDS SEARCHED (Int.Cl.6) B65D
A	US 3 490 583 A (COOK WILLIAM H) 20 January 1970		
A	US 4 753 831 A (HOSOYAMADA GEN-ICHI ET AL) 28 June 1988		
A	EP 0 542 553 A (KAYSERSBERG)		

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	2 July 1997	Zanghi, A

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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